

WHAT IS CLAIMED IS:

1. A scanning probe microscope comprising:
 - a stationary frame;
 - a first scanner attached to the stationary frame, and a sample chuck attached to the
 - 5 first scanner, the sample chuck being movable by the first scanner in a plane;
 - a second scanner physically detached from the first scanner and attached to the stationary frame;
 - a cantilever supported by the second scanner, and a probe tip attached to a free end of the cantilever, the cantilever being movable by the second scanner along a line
 - 10 perpendicular to the plane of movement of the sample chuck.
2. The scanning probe microscope of Claim 1 further comprising:
 - a reflector located on the cantilever;
 - a light source aimed at the reflector; and
 - a photodetector positioned to receive a portion of light from the light source
 - 15 reflected by the reflector.
3. The scanning probe microscope of Claim 2 wherein:
 - the photodetector is mounted on the second scanner.
4. The scanning probe microscope of Claim 2 wherein:
 - the photodetector is mounted on a stage, and the stage is mounted on the
 - 20 stationary frame;
 - the light source is mounted on the stage; and
 - the second scanner is mounted on the stage.
5. The scanning probe microscope of Claim 1 further comprising:
 - an objective lens and a camera supported by the stationary frame, along the line of
 - 25 movement of the probe tip.

6. The scanning probe microscope of Claim 1 wherein:
the second scanner comprises a stacked piezoelectric actuator.
7. The scanning probe microscope of Claim 1 further comprising:
a mirror supported by the stationary frame, at a fixed location relative to
5 movement of the probe tip provided by the second scanner.
8. The scanning probe microscope of Claim 7 wherein:
the mirror is oriented parallel to the line of movement of the probe tip.
9. The scanning probe microscope of Claim 7 wherein:
the mirror is oriented at an angle relative to the line of movement of the probe tip.
- 10 10. The scanning probe microscope of Claim 9 wherein the mirror is hereinafter "first
mirror," and the microscope further comprises:
a second mirror supported by the stationary frame, parallel to the first mirror.
11. The scanning probe microscope of Claim 10 wherein:
each of the first mirror and the second mirror are located on opposite sides of the
15 predetermined straight line.
12. The scanning probe microscope of Claim 11 further comprising:
a photodetector positioned opposite to the second mirror, to receive light from the
light source reflected by a reflector located on the cantilever, the first mirror and the
second mirror.
- 20 13. The microscope of Claim 1 wherein:
the first scanner comprises an x-y flexure stage.
14. The microscope of Claim 1 wherein:
the sample chuck is movable by the first scanner only in a plane; and

the fixed end of the cantilever is movable by the second scanner only in a direction perpendicular to the plane of movement of the sample chuck by the first scanner.

15. A microscope arrangement comprising:

5 a scanner mounted on a stage, the scanner being limited to linear motion in the direction of motion of the stage;

a cantilever supported by the scanner, the cantilever having a free end; and

an objective lens supported by the stage, the lens having an axis parallel to the direction of motion of the stage.

10 16. The microscope arrangement of Claim 15 further comprising:

a reflector supported by the stage between the cantilever and the objective lens, along a line parallel to the axis of the objective lens, the line passing through the free end of the cantilever; and

15 a source of light aimed at the reflector and laterally offset from the axis, the source of light being supported by the stage.

17. The microscope arrangement of Claim 15 wherein:
the axis of the lens is coincident with the line.

18. The scanning probe microscope of Claim 15 further comprising:

a reflector located on the cantilever;

20 a light source aimed at the reflector; and

a photodetector positioned to receive a portion of light from the light source reflected by the reflector.

19. A method for evaluating a sample, the method comprising:

moving a probe tip attached to a free end of a cantilever in a first direction;

25 moving a sample in a plane perpendicular to the first direction, without moving the probe tip; and

measuring deflection of the cantilever during at least one of the acts of moving.

20. The method of Claim 19 further comprising:

moving a photodetector simultaneously with moving of the probe tip, wherein a distance of movement of the photodetector is identical to the distance of movement of the probe tip;

5 wherein a steering mirror is kept stationary during movement of each of the probe tip and the photodetector.